found only in the White mountains of New Hampshire. By a mistake the range of this species was indicated in map I of my monograph as being in western North America. The error is not fatal, or even serious, as in the text (p. 173) the region is indicated properly. I should like to call special attention to the blunder, however, and to ask that area 12 on map I be stricken out.

A species which possibly occurs in North America, but whose presence cannot be proved as yet with certainty, is *E. hirtella* Jord. I found three specimens of it in the herbarium of the Royal Museum at Berlin, mixed with specimens of *E. Americana*, and ticketed "*E. officinalis*, flora boreal-Americ. (*Hooker*)."—RICHARD VON WETTSTEIN, *Prag, Austria.*

ABORTIVE FLOWER BUDS OF TRILLIUM.

DURING a course of study upon the development of pollen grains, an attempt was made to secure early spring buds of Trillium. Plants taken from beneath the still frozen soil near Ithaca on April 5 were examined. Among fifteen plants one bud was found about 15^{mm} in length, in which the pollen mother-cells had already separated from one another and were undergoing nuclear division. The other fourteen plants had minute buds 3^{mm} or less in length, in some cases the leaves of the perianth being distinguishable with the naked eye, in others only a slight projection above the receptacle being made out. Some of these small buds were treated with collodion and sectioned, when the sepals were found to be clearly differentiated, but within was only a confused mass of cells, many of them apparently dead, with almost no differentiation of petals, stamens, and pistil.

On April 15 a large number of plants just appearing above ground were collected. Only a small proportion contained healthy buds, and in these the pollen mother-cells were in the later stages of division, or, in some cases, the pollen grains were already formed. Sixty plants in which there were no growing buds were examined with a hand lens. In only three or four did the lens fail to show some traces of a bud, in some cases, as before, only a slight elevation. Usually the rudiment of a perianth could be distinguished, either as a white speck or as very evident floral leaves, sometimes 2 to 3^{mm} in length, but withered and evidently abortive.

As care had been taken to collect plants with indications of buds,

it is not certain that there were not truly sterile plants in the field, but the observations were sufficient to show that a large number of those that would be regarded as sterile at a later date had made an attempt to produce blossoms and had been more nearly successful in the case of the outer leaves than of the sporophylls.

The early development of the buds of spring flowers has been referred to by different writers. Foerste[2] mentions among the buds collected in Vermont, August 22–28, one of *Trillium erythrocarpum* 5.5^{mm} in length. The present writer found in central New York, on July 11, a flower bud of *T. grandiflorum* 2^{mm} in length, with anthers 1.7^{mm} long. There was no opportunity to learn the stage in the development of the pollen.—ARMA A. SMITH, *Cornell University*.

A STUDY OF SOME ANATOMICAL CHARACTERS OF NORTH AMERICAN GRAMINEÆ. VII.

(WITH PLATE XX)

THE GENUS AMPHICARPUM.

ONLY two species are known of this singular genus, *A. Floridanum* Chapm. and *A. Purshii* Kth., their geographical distribution being limited to the eastern United States, along the Atlantic coast. They both grow in sandy soil, but while *A. Floridanum* does not occur outside the semi-tropical Florida, the other species shows a larger range of distribution, from New Jersey as far south as Georgia. Their manner of growth is different, *A. Purshii* being cespitose, while *A. Floridanum* is stoloniferous, but otherwise they show a rather similar appearance, especially in regard to their floral characters, both developing their fruits underground, as true geocarpic plants. By comparing their leaf-structure we shall see that according to their distribution, and the character of the soil wherein they grow, the anatomical differences are but slight, and almost wholly dependent upon the development of the epidermis. These divergences, slight as they are, prove nevertheless sufficient to enable us to distinguish the two species anatomically.

AMPHICARPUM FLORIDANUM.—The epidermis of the superior face of the leaf (*fig.* 2) consists generally of thick walled cells, which vary considerably in size and shape according to their disposition, whether

[2] On the relations of certain fall to spring blossoming plants, BOT. GAZ. 17: 1. 1892.